

[0037] FIG. 5 illustrates a cut-away side view of a connector adapter according to an embodiment of the present invention. Magnetic connector receptacle 210 may include a housing 540 and around a nonconductive inner housing 214. Nonconductive inner housing 214 may include contacts 220 terminating in board 510. Magnets 520 may be placed around the contacts 220. In a specific embodiment of the present invention, four magnets 520 may be used. Back plate 530 may be used to direct the flux through magnets 520. Connector insert 250 may include contacts 560 surrounded by shield 570 and supported by housing 562. Contacts 560 may also terminate on board 510. Traces on board 510 may connect contacts 220 in magnetic connector receptacle 210 to contacts 560 in connector insert 250. Board 510 may also support connection detection resistors, current limiting diodes, and other components as needed.

[0038] While embodiments of the present invention are well-suited for connector adapters, in other embodiments of the present invention, the MagSafe connector receptacle and USB Type-C connector insert may be connectors on a dongle or cable adapter that may also include one or more additional connector receptacles, such as an High-Definition Multimedia Interface connector receptacle, a Video Graphics Array (VGA) connector receptacle, and other types of connector receptacles.

[0039] In various embodiments of the present invention, the components of the adapters may be formed in various ways of various materials. For example, contacts or pins, interconnect lines, and other conductive portions of the adapters may be formed by stamping, metal-injection molding, printing, machining, micro-machining, 3-D printing, or other manufacturing process. The conductive portions may be formed of stainless steel, steel, copper, copper titanium, phosphor bronze, or other material or combination of materials. They may be plated or coated with nickel, gold, or other material. The nonconductive portions, such as the adapter housings and other portions, may be formed using injection or other molding, 3-D printing, machining, or other manufacturing process. The nonconductive portions may be formed of silicon or silicone, rubber, hard rubber, plastic, nylon, elastomers, liquid-crystal polymers (LCPs), ceramics, or other nonconductive material or combination of materials.

[0040] Embodiments of the present invention may provide adapters that may be located in, and may connect to, various types of devices, such as portable computing devices, tablet computers, desktop computers, laptops, all-in-one computers, wearable computing devices, cell phones, smart phones, media phones, storage devices, portable media players, navigation systems, monitors, power supplies, adapters, remote control devices, chargers, and other devices. These adapters may provide pathways for signals that are compliant with various standards such as Universal Serial Bus (USB), USB2, USB3, USB Type-C, High-Definition Multimedia Interface® (HDMI), Digital Visual Interface (DVI), Ethernet, DisplayPort, Thunderbolt™, Lightning™, Joint Test Action Group (JTAG), test-access-port (TAP), Directed Automated Random Testing (DART), universal asynchronous receiver/transmitters (UARTs), clock signals, power signals, and other types of standard, non-standard, and proprietary interfaces and combinations thereof that have been developed, are being developed, or will be developed in the future. In various embodiments of the present invention, these interconnect paths provided by these adapters

may be used to convey power, ground, signals, test points, and other voltage, current, data, or other information.

[0041] The above description of embodiments of the invention has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form described, and many modifications and variations are possible in light of the teaching above. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications to thereby enable others skilled in the art to best utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. Thus, it will be appreciated that the invention is intended to cover all modifications and equivalents within the scope of the following claims.

What is claimed is:

1. An adapter comprising:

a connector receptacle comprising:

a plurality of contacts; and

a plurality of magnets;

a connector insert comprising:

a plurality of contacts;

a first connection detection component coupled between one of the plurality of contacts in the connector receptacle and one of the plurality of contacts in the connector insert; and

a second connection detection component coupled between one of the plurality of contacts in the connector receptacle and one of the plurality of contacts in the connector insert.

2. The adapter of claim 1 wherein the plurality of contacts in the connector receptacle comprise two power contacts and two ground contacts, and each is electrically connected to at least a corresponding one of the plurality of contacts in the connector insert.

3. The adapter of claim 1 wherein the connector insert is a Universal Serial Bus Type-C connector insert.

4. The adapter of claim 3 wherein the first connection detection component is a resistor coupled between a connection detection contact of the Universal Serial Bus Type-C connector insert and a power supply contact of the connector receptacle.

5. The adapter of claim 4 wherein the second connection detection component is a resistor coupled between a connection detection contact of the connector receptacle and a ground contact of the Universal Serial Bus Type-C connector insert.

6. The adapter of claim 1 wherein the plurality of contacts in the connector receptacle are located on a raised surface, where the raised surface is surrounded by a recess.

7. The adapter of claim 1 further comprising a backplate attached to the plurality of magnets such that the plurality of magnets are between the backplate and a connection surface of the connector receptacle.

8. An adapter comprising:

a magnetic connector receptacle comprising:

a plurality of contacts comprising:

a center connection detection contact;

two ground contacts, one on each side of the center connection detection contact; and

two power supply contacts, each between the center contact and a ground contact; and

a plurality of magnets; and